A Bibliometric Analysis of Surgical Site Infections in Pediatric Surgery

Aydın NART[*], Meltem ASLAN[**]

Abstract

Aim: This study aims to examine the existing scientific literature on surgical site infections in the field of pediatric surgery through a bibliometric analysis. In this context, it aims to identify publication trends and highlight current research gaps within the field.

Method: A total of 956 articles were included in the analysis based on a search conducted on October 8, 2025, in the Web of Science database using keywords such as "surgical site infection," "children," and "pediatric surgery." The bibliometric evaluation was carried out using the Biblioshiny interface. Parameters such as publication years, keywords, countries, journals, and citations were analyzed.

Results: A total of 956 articles published between 1987 and 2025 included 8,624 authors. The United States was identified as the country with the highest number of publications. Journal of Pediatric Surgery was found to be the journal with the highest number of publications and citations. According to the Keywords Plus analysis, the most frequently used terms were "children" (n=413, 14%), "surgical site infection" (n=184, 6%), "surgery" (n=163, 5%), "complications" (n=162, 5%), and "risk factors" (n=144, 5%).

Conclusion: This study provides a structured and comprehensive overview of the scientific research on surgical site infections in pediatric surgery. The findings indicate that SSIs have been the focus of scientific investigation for many years and continue to hold clinical and academic importance today. However, in light of the gaps identified in the existing literature, the need for more comprehensive and in-depth studies is evident.

Keywords: Bibliometric analysis, child, surgical site infection.

Pediatrik Cerrahide Cerrahi Alan Enfeksiyonları Üzerine Bibliyometrik Analiz

Öz

Amaç: Bu çalışmanın amacı, pediatrik cerrahi alanında cerrahi alan enfeksiyonu ile ilgili mevcut bilimsel literatürü bibliyometrik analiz yöntemiyle incelemektir. Bu kapsamda, alandaki yayın eğilimleri ve mevcut araştırma boşluklarının ortaya konulması hedeflenmiştir.

Yöntem: 8 Ekim 2025 tarihinde, Web of Science veri tabanında "surgical site infection", "children" ve "pediatric surgery" gibi terimler kullanılarak yapılan tarama sonucunda 956 makale analize dahil edilmiştir.

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[*] Asst. Prof., Istanbul Esenyurt University, Faculty of Health Sciences, Department of Nursing, Istanbul, Türkiye.
E-mail: aydinnart@esenyurt.edu.tr ORCID https://orcid.org/0000-0001-8700-8889
[**] Asst. Prof., Istanbul Esenyurt University, Faculty of Health Sciences, Department of Midwifery, Istanbul, Türkiye.
E-mail: meltemaslan@esenyurt.edu.tr ORCID https://orcid.org/0000-0003-3847-2233

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Bibliyometrik değerlendirmede Biblioshiny arayüzü kullanılarak yapılmıştır. Yayın yılları, anahtar kelimeler, ülkeler dergi ve atıflar analiz edilmiştir.

Bulgular: 1987–2025 yılları arasında yayımlanan 956 makalede toplam 8624 yazar yer almıştır. En fazla yayına sahip ülkenin Amerika Birleşik Devletleri olduğu belirlenmiştir. En fazla yayın ve atıf yapılan dergi Journal of Pediatric Surgery dergisidir. Keywords Plus analizine göre en sık kullanılan terimler "children" (n= 413, %14), "surgical site infection" (n = 184, %6), "surgery" (n = 163, %5), "complications" (n = 162, %5), and "risk factors" (n = 144, %5) olarak belirlenmiştir.

Sonuç: Çalışmada, pediatrik cerrahi alanında cerrahi alan enfeksiyonları üzerine yürütülen mevcut bilimsel çalışmalara ilişkin yapılandırılmış ve kapsamlı bir genel bakış sunmaktadır. Elde edilen bulgular, cerrahi alan enfeksiyonlarının uzun süredir bilimsel araştırmalara konu olduğunu ve günümüzde de klinik ve akademik açıdan önemini koruduğunu göstermektedir. Bununla birlikte, mevcut literatürdeki boşluklar doğrultusunda daha kapsamlı ve derinlemesine çalışmaların gerekliliği ön plana çıkmaktadır.

Anahtar Sözcükler: Bibliyometrik analiz, çocuk, cerrahi alan enfeksiyonu.

Introduction

Surgical site infections (SSIs) are infections that develop at the surgical incision site or elsewhere in the body within 30 to 90 days after a surgical procedure[1,2]. These infections are most commonly caused by microorganisms residing on the skin surface, and the primary intervention for their prevention is the removal of transient microorganisms from the body surface[3]. Despite advancements in asepsis and antisepsis practices, surgical techniques, and antibiotic prophylaxis, SSIs remain one of the most common postoperative complications worldwide, contributing significantly to high morbidity and mortality rates[4,5].

SSIs are one of the most frequent hospital-acquired infections in children and pose a substantial burden on patients, their families, and the healthcare system[6]. Approximately one-quarter of SSI cases in pediatric surgical patients are among the leading causes of hospital readmissions[7]. According to the World Health Organization, nearly 50% of SSIs are preventable[8]. The implementation of prevention bundles, including skin antisepsis, has been shown to yield successful outcomes in reducing SSI rates among children[9].

When examining the bibliometric analysis method, it is described as an analytical approach that employs statistical tools and mathematical techniques to measure mutual relationships and impacts. The primary purpose of conducting such an analysis is to provide a general overview of the literature by obtaining outputs related to the year of publication, keywords used, citation counts, topics, authors, countries, and institutions[10,11]. In the results, the main objective is to reveal both the quantitative and qualitative data of the scientific literature[12]. Bibliometric studies are also considered among the methods that uncover the relationships among stakeholders of scientific communication and aim to determine the level of contribution between these actors[13].

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Material and Methods

This study utilized bibliometric analysis and science mapping techniques. A search was conducted in the Web of Science (WoS) database using the keywords “surgical site infection,” “children,” and “pediatric surgery.” After applying specific filters, a total of 956 peer-reviewed studies were identified. Studies focusing on SSIs in the pediatric field were included without any restriction on publication year or author name. Only publications written in English and classified as “Article” were included in the analysis, while reviews, book chapters, and letters to the editor were excluded.

In bibliometric analyses, because large datasets are typically involved, it is crucial to restrict the database to a specific time period to enhance the search process's efficiency and effectiveness, thereby optimizing the results[13]. Based on this consideration, the search was conducted in the WoS database on a single day (October 8, 2025) due to the continuous flow of scientific data into the database. The dataset compiled in this study was analyzed using the Biblioshiny program to enable a comprehensive and multidimensional examination of the literature.

Research Questions

1) What is the annual distribution of scientific publications on SSIs in the field of pediatric surgery, and what are the publication trends over time?

2) Which countries, institutions, and authors have produced the highest number of publications on SSIs in pediatric surgery?

3) Which journals have published the highest number of articles and received the greatest number of citations in this field?

4) What are the most frequently used keywords and the prominent research themes in the literature on SSIs in pediatric surgery?

5) According to the keyword co-occurrence analysis, which concepts show the strongest relationships within the literature on SSIs in pediatric surgery?

Results

Between 1987 and 2025, a total of 956 articles addressing the topic of SSIs in the field of pediatric surgery were published. A total of 8,624 authors were identified, with only 18 articles written by a single researcher. The rate of international collaboration among the articles was 11.9% (Fig.1.).

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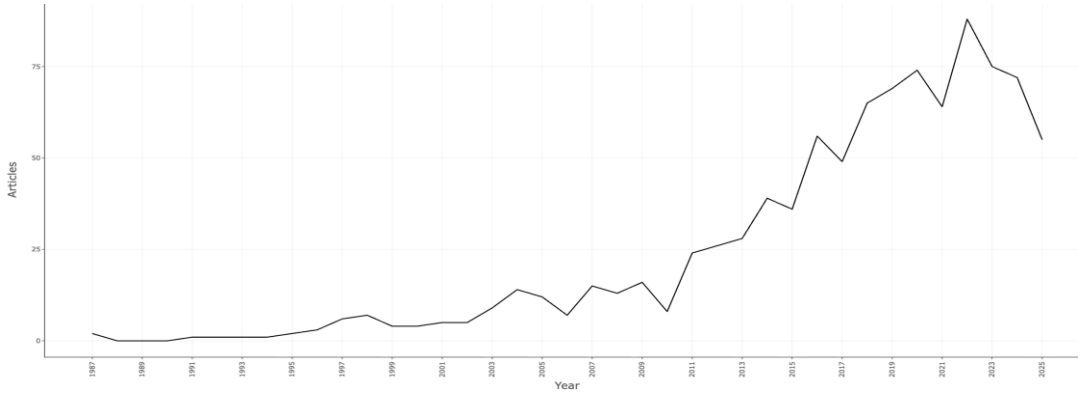
Figure 1. Main data statistics.

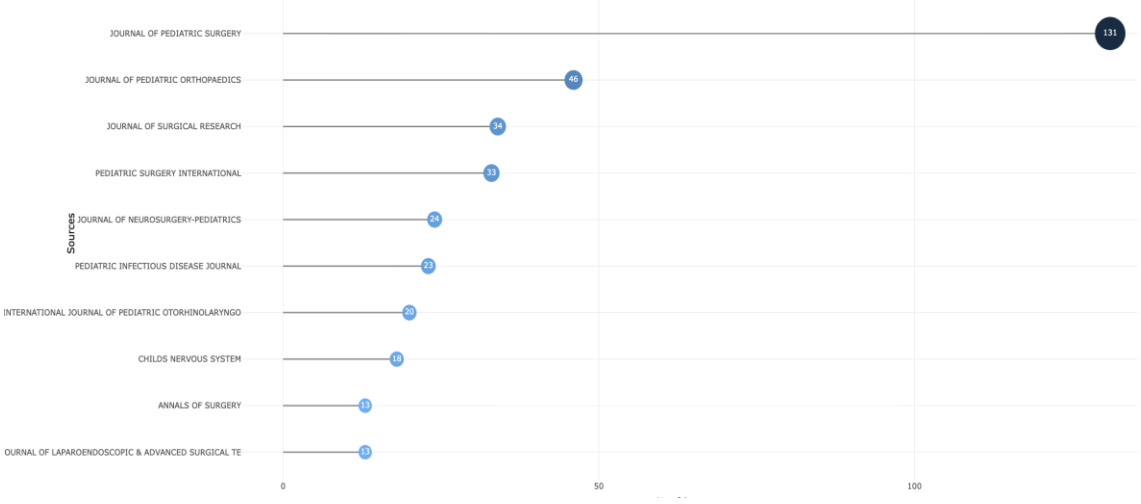
When analyzing the annual distribution of scientific production, no consistent growth trend in publication performance was observed between 1987 and 2025. The highest number of articles was recorded in 2022 (Fig.2.).

Figure 2. Annual scientific production.



Among the most relevant sources, the *Journal of Pediatric Surgery* was identified as the journal with by far the highest number of publications, totaling 131 articles (Fig.3.).

Figure 3. Most relevant sources.



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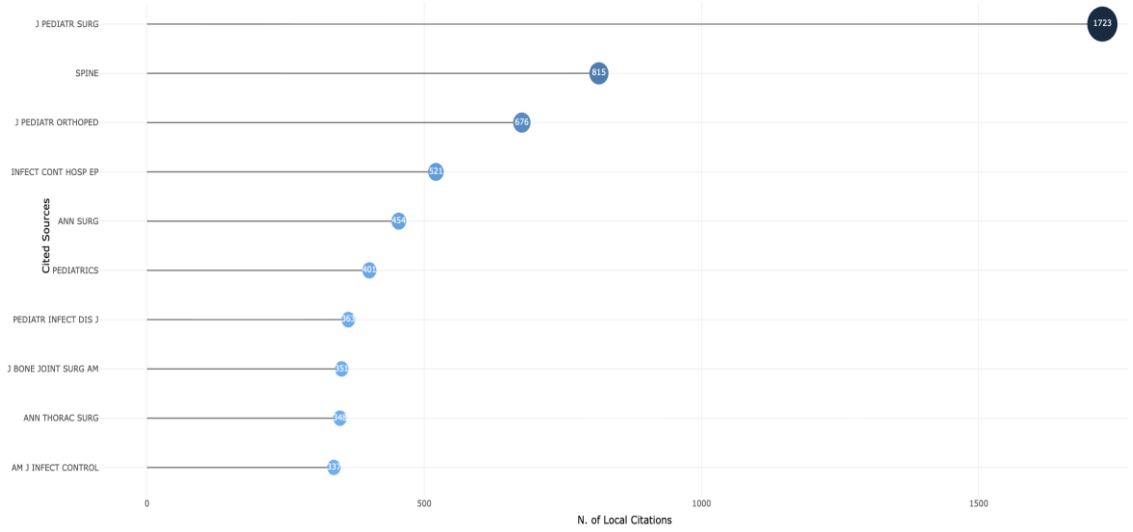
This finding reveals which journals are the most influential and most frequently cited in the field. With 1,723 citations, the *Journal of Pediatric Surgery* was determined to be the journal with by far the most citations (Fig.4.).

Figure 4. Most local cited sources.



A review of the global distribution of scientific publications shows that the United States ranks first in terms of output. Figure 5 illustrates the top 10 countries with the highest number of published articles. In Figure 6, the country marked in dark blue represents the one with the greatest publication volume. Countries shaded in lighter blue have produced fewer publications, while those in gray signify regions with no publications in the respective field to date.

Figure 5. Number of scientific articles produced by country.

Country	Freq
USA	2115
UK	444
ITALY	327
CANADA	143
JAPAN	141
FRANCE	137
CHINA	97
EGYPT	89
AUSTRALIA	80
SWITZERLAND	76

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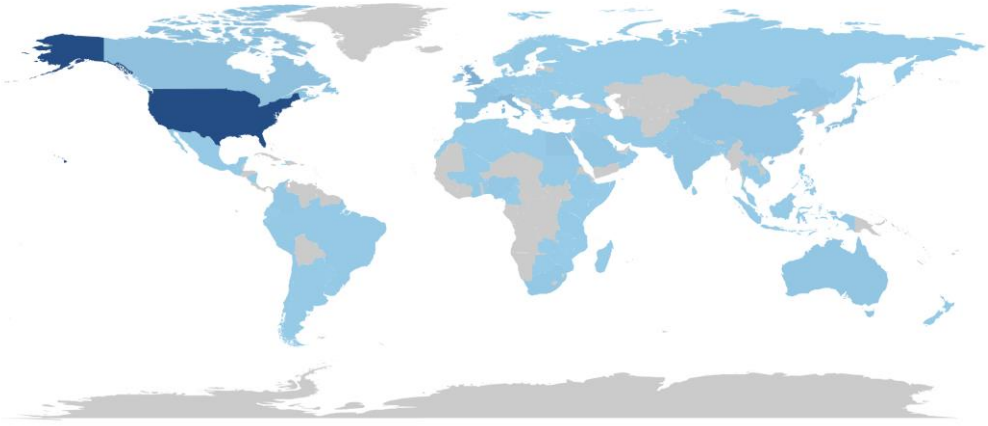
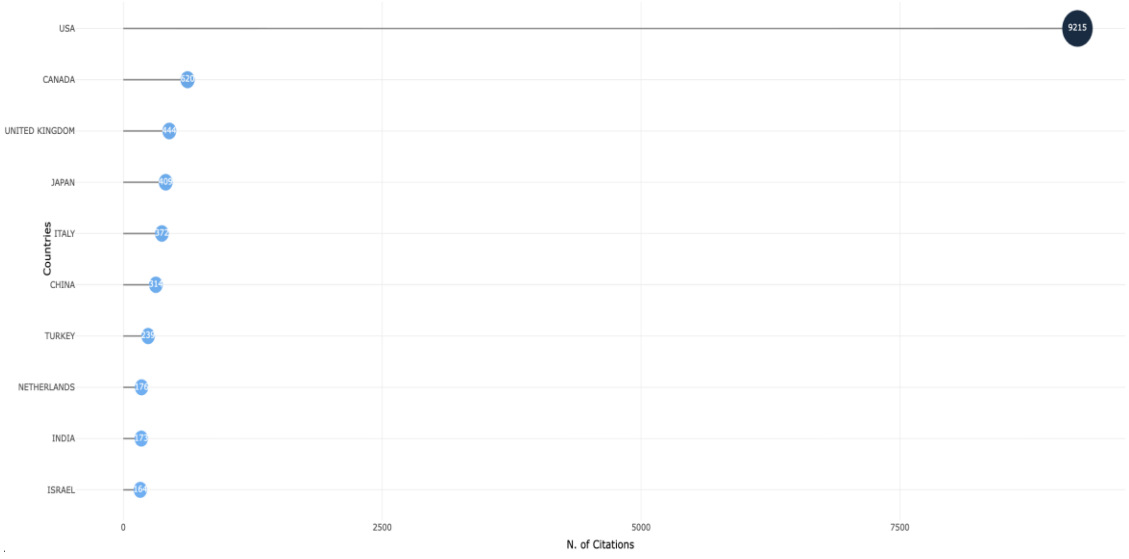
Figure 6. Scientific production by country.



Analyses of the global distribution of scientific output indicate that the United States leads in the number of publications. Consistent with this, it has also been identified as the country with the highest citation count, totaling 9,215 citations (Figure 7).

Figure 7. Most cited countries.



According to the analysis results, the most frequently used keywords include “children” (n=413; 14%), “surgical site infection” (n=184; 6%), “surgery” (n=163; 5%), “complications” (n=162; 5%), and “risk factors” (n=144; 5%) (Figure 8).

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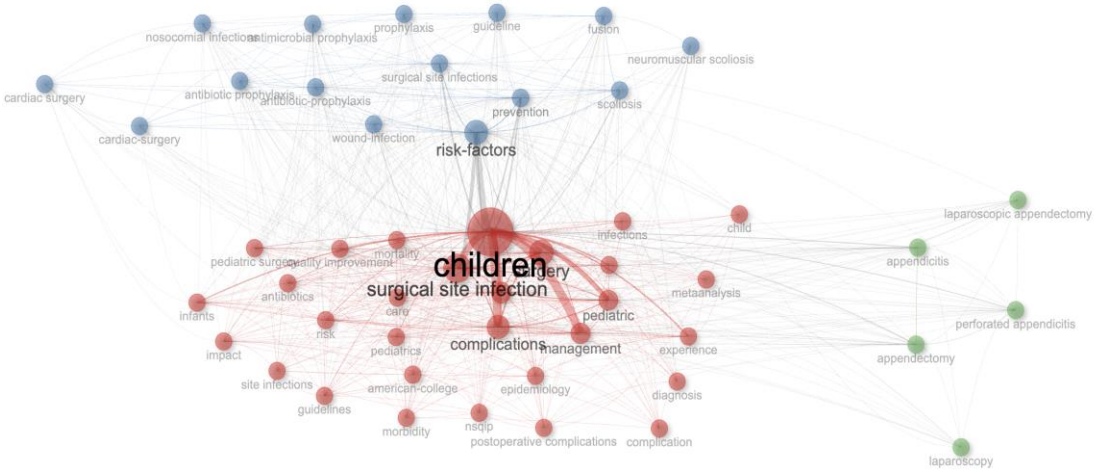
Figure 8. Keyword plus treemap.

The results of the network analysis illustrate the relationships and links between various keywords. Among them, “children” emerges as the most strongly connected keyword in the examined literature (Fig.9.).

Figure 9. Keyword plus co-occurrence network.



Discussion

SSI has remained a significant issue throughout history and continues to be a relevant topic today[14]. SSIs lead to a decrease in patients’ quality of life, prolonged hospital stays, increased healthcare costs, and higher mortality rates. Therefore, identifying and effectively implementing evidence-based strategies to prevent SSI is of great importance and necessity[15,16].

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There are numerous studies related to SSIs in the field of pediatric surgery. The aim of this study is to map the literature and make the existing body of knowledge visible. No consistent growth trend in publication performance was observed for the articles reviewed in the study, which span from 1987 to 2025. A significant decline occurred in 2021, followed by the highest number of publications in 2022. A similar trend was identified in a related study, where a decrease in the number of publications was observed in 2020, with a subsequent increase in 2021. These results are thought to be due to the isolation measures and the shift in research focus caused by the COVID-19 pandemic[16].

The study found that, among all countries analyzed, the United States had the highest volume of scientific publications. Additionally, the most influential and most frequently cited journal was identified as the Journal of Pediatric Surgery. The Journal of Pediatric Surgery is a US-based, internationally respected, and high-impact scientific journal in the field of pediatric surgery. A review of the literature shows that the United States is one of the leading countries in scientific productivity worldwide. This is attributed to its strong research infrastructure, funding mechanisms, and publishing system[17]. The increasing trend observed in the nursing research literature (in both funded and non-funded studies) indicates a rising trend in research funding within the field of nursing. Furthermore, an examination of regionally focused literature production shows that a large portion of scientific publications is produced by more developed and economically powerful countries[18].

According to the results of the Keyword Plus analysis, the most frequently used keywords include “children” (n = 413, 14%), “surgical site infection” (n = 184, 6%), “surgery” (n = 163, 5%), “complications” (n = 162, 5%), and “risk factors” (n = 144, 5%). The network analysis results visualize the relationships and connections between these keywords. Among the analyzed literature, the keyword with the strongest connections was identified as “children”. This term is at the center of the research area and shows strong associations with other themes. Additionally, the terms “complications” and “risk factors” were found to be closely related to SSIs in the literature. SSIs are considered one of the most common and complex complications occurring in the postoperative period; they increase morbidity rates, prolong hospital stays, raise healthcare costs, and significantly contribute to mortality in severe cases[19]. Patient-specific risk factors play a decisive role in the development of SSIs. These factors include age (particularly in newborns and the elderly), malnutrition, obesity, diabetes, immunosuppression, smoking, and chronic conditions such as kidney or liver failure[20]. These results emphasize the need for thorough evaluation of individual risk factors and the creation of patient-focused prevention strategies to reduce SSIs. Overall, our study’s findings were found to be in alignment with the existing body of literature.

Conclusion

This bibliometric analysis provides a structured and comprehensive overview of the scientific literature on SSIs in the field of pediatric surgery. The findings demonstrate that SSIs have remained a persistent focus of academic and clinical research over several

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decades, underscoring their ongoing importance as a major patient safety and quality-of-care issue in pediatric surgical practice. The analysis reveals that research output in this field is largely concentrated in high-income countries, with the United States leading both in publication volume and citation impact. This concentration highlights disparities in global research capacity and emphasizes the need to strengthen international collaboration, particularly involving low- and middle-income countries where the burden of SSIs may be substantial but underrepresented in the literature. Keyword and network analyses indicate that current research predominantly focuses on complications and patient-related risk factors, reflecting the clinical priority of understanding SSI etiology and prevention. These findings underscore the importance of individualized risk assessment and the development of targeted, evidence-based prevention strategies in pediatric surgical care. However, the literature also reveals gaps in areas such as standardized prevention protocols, implementation science, and context-specific interventions tailored to diverse healthcare settings. In conclusion, this study contributes to the existing body of knowledge by mapping publication trends, thematic priorities, and research gaps in pediatric surgical site infection research. The results provide a valuable reference framework for clinicians, researchers, and policymakers, and may guide future studies aimed at improving infection control practices, enhancing patient safety, and optimizing surgical outcomes in pediatric populations.

Limitations

This study has several limitations. Restricting the analysis to the Web of Science (WoS) database may have limited the comprehensive representation of the literature. In addition, including only studies published in English may have resulted in the exclusion of important research in other languages, thereby limiting global representation. Finally, limiting the scope to publications classified solely as “articles” may have led to the exclusion of potentially relevant publication types, such as reviews, letters, and conference proceedings.

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